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FUTURES CLASSIFICATION AND QUALITY ASSURANCE IN USDA, AMS, COTTON PROGRAM

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Abstract

The USDA, AMS, Cotton Program provides classification services to the cotton industry as authorized by the U.S. Cotton Statistics and Estimates Act, the Cotton Standards Act and the U.S. Cotton Futures Act. Practically all cotton grown in the United States is classed by the Cotton Program at the request of producers. The Cotton Program also provides classification services for all cotton tendered for delivery on futures contract at the New York Board of Trade.

The Cotton Program maintains a stringent quality assurance program to ensure accurate classification results are provided to the cotton industry. The utilization of standardized quality assurance procedures in all classing operations ensures that cotton is classed uniformly in all Cotton Program offices across the cotton belt. The Cotton Program actively investigates new techniques and methods to enhance the accuracy and reliability of classification data provided to the domestic and international cotton industries.

Quality Assurance Program

Since 1980 when the Cotton Program began HVI operations, the volume of samples tested has expanded from 300,000 bales to over 19,000,000 in 2001. This large scale testing has resulted in continuous change and improvement in classing and HVI testing procedures. The Cotton Program is constantly implementing stricter and more rigid testing procedures to improve the accuracy of its classing information. The objective is to provide timely, accurate and reliable fiber measurements and grade determinations and operate a cost efficient operation by making maximum use of available resources.

The Cotton Program currently operates 12 classing offices located throughout the Cotton Belt from California to South Carolina. At peak operation, approximately 250 HVI lines and approximately 330 classers are utilized in these offices to provide classification services. The primary responsibility of the Quality Assurance Branch of the Cotton Program is the technical supervision of classing programs. In order for the classification data assigned to a given sample of cotton to be accepted by the entire cotton industry, be it growers, merchants, ginners, spinners or researchers, it is imperative that the classification is based on the official standards and is conducted using standardized laboratory procedures.

Measures utilized by classing offices to ensure quality assurance include pre-season precision and accuracy testing for HVI's, environmental controls and conditioning, calibration and in-house checks and checklots. Precision and accuracy requires each line in each office to pass an evaluation. Cotton with known values is tested a multiple of times on each instrument. All instruments must demonstrate precision and accuracy of known value cotton. HVI Lines are not put into production until successful completion of all preseason precision and accuracy tests.

Environmental controls are necessary because some of the fiber determinations are moisture sensitive (primarily strength, mike, and length). All USDA laboratories and receiving rooms are maintained within the ASTM standards for temperature (70 degree F +/-1.0 degree) and humidity (65% relative humidity +/-2%). The cotton samples must fall within the range of 6.75% - 8.25% moisture prior to HVI classification.

Cotton samples received for classification are often outside the allowable moisture range and must be conditioned. In the past the samples had to undergo 48 hour passive conditioning to ensure that each had reached equilibrium within the prescribed moisture range. Today, in most Cotton Program facilities, Rapid Conditioning Units (RCU's) are used to quickly condition samples for testing. The RCU is a wire mesh conveyor connected to a plenum through which the surrounding conditioned air is drawn by a high-speed fan. Samples passed over this plenum can usually be conditioned within 12 - 18 minutes.

Calibration measures include using known value cottons to calibrate HVI lines for micronaire, length, strength and length uniformity. HVI colorimeters and trash meters are calibrated using tiles. Classers "calibrate" themselves by reviewing and referring to the Universal Standards, which represents all physical color grades and all leaf grades. The Universal Standards are replaced annually due to the inherent change in color as cotton ages.

Process control charting and in-house checks are utilized to verify the HVI calibration levels are accurate. These checks are performed at a minimum of every two hours through each shift of operation. In-house checks verify that the line can reproduce the test results of known value cotton. Process control charting (PCC) utilizes statistical sampling techniques to determine whether or not the process is in "control". If either in-house or PCC checks indicate that the line is not testing correctly,

the entire process is checked for error, i.e. sample conditioning, operator error, HVI malfunction. If none is found, the line is re-calibrated and the testing levels are verified once more.

In order to maintain a consistent classification throughout the Cotton Program, approximately 1.0 percent of all cotton classed in each Classing Office each day is randomly selected for a verification check by the Quality Assurance Branch. These samples are known as checklot samples throughout the Cotton Program. These checklot samples are randomly selected by computer after the original classing information has been assigned to the sample by the classing office. The classer is alerted to save the selected sample, which is then submitted, to the Quality Assurance Branch. No quality data can be changed on the checklot samples after the computer has selected it.

By verifying the exact sample used at the classing offices, Cotton Program personnel are better able to determine problem areas and to concentrate efforts on those areas. The monitoring of all checklot samples by the same group of HVI lines and permanently employed supervisors at the Quality Assurance Branch, the Cotton Program is better able to ensure that samples are classed uniformly throughout the entire cotton belt. In other words, instead of 12 different supervisors in 12 different offices determining what he or she interprets to be a leaf grade 3 for that given area, the Cotton Program utilizes a group of 5 - 7 supervisors to review cotton harvested and ginned from all over the cotton belt ensuring that the samples are graded in accordance with approved standards and practices throughout the Cotton Program.

When Quality Assurance notices that an office, a shift within an office, particular classer or instrument is having a reproducibility problem or a tendency to classify cotton too easy or hard, immediate interaction with the Classing Office Area Director takes place. In instances where a problem is considered of sufficient importance, staff members of Quality Assurance are sent to offices to provide assistance in the solution.

The Quality Assurance Branch keeps each office informed of reproducibility results and maintains an ongoing comparison of classer reproducibility and HVI supervision results for the Cotton Program. This keeps all key personnel throughout the Cotton Program abreast of performance in comparison to the previous years as well as performance in regards to the goals established prior to each season.

In our effort to ensure uniform international testing, the Cotton Program also conducts a HVI Check Test and an International Level Assessment Program. This allows the USDA to work cooperatively with Domestic and International Associations in pursuit of uniform HVI fiber quality measurements. These associations are provided with comparison reports of their HVI measurement results obtained from the test samples for the seven HVI quality factors. These programs have proven to be beneficial in achieving more consistent testing levels and reduced HVI variability throughout the world cotton industry.

The Cotton Program's HVI check test is a monthly program where samples are sent each month to participating laboratories. These laboratories test the samples for fiber property measurement by HVI and fax the testing results to the Cotton Program. Once the testing has been completed, the participants receive monthly reports on the actual established values of the samples, the averages of results of all participants on each of the two samples and a comparison of their individual results to the established values. The participants calibrate the HVI instruments to ICCS (Micronaire Only) standards for Micronaire and to HVI calibration cottons for lengths, length uniformity and strength.

Under the International Level Assessment Program an organization will test and send a lot of cotton consisting of ten to twenty samples to the Quality Assurance Branch. A report of the organization's test results compared to test results from the Quality Assurance Branch, showing reproducibility and bias for each fiber measurement, is returned to the organization as soon as testing is completed. A cumulative report for the year is also returned to the organization. This program allows international organizations to test cotton samples at the same level as the USDA.

Futures Classification

The Cotton Program's Quality Assurance Branch provides classification services for all cotton that is tendered for delivery on futures contracts at the New York Board of Trade. This classification service is authorized through the U.S. Cotton Futures Act and through an agreement between the Cotton Program and the New York Board of Trade. Cotton Program personnel work closely with the representatives of the New York Board of Trade to ensure that all rules and regulations are followed. Samples submitted for futures classification must be drawn and submitted by a warehouse licensed by the Cotton Program and approved by the New York Board of Trade. These warehouses must also be located in one of the five delivery points approved by the New York board of Trade. The approved delivery points are Greenville, SC; Memphis, TN; New Orleans, LA; Houston, TX; and Galveston, TX.

The volume of samples received at the Quality Assurance Branch can vary widely from day to day depending on the market situation. Unlike the classification of new crop samples which takes place from late summer too early winter, the receipt of futures samples at the Quality Assurance Branch can begin and terminate upon very short notice. The number of samples

submitted to the Quality Assurance Branch for a given delivery month can be highly unpredictable (See Chart 1). The Quality Assurance Branch must be prepared to adjust the classification operation on a very short notice to ensure futures classification data is provided to the industry in a timely manner.

Cotton submitted to the Cotton Program for futures classification is delivered in lots that contain from 1 to 100 samples. The bales included in each lot must contain sequential bale numbers that are specifically assigned to a predetermined lot number. Prior to sampling, the futures warehouse must request lot numbers from the New York Board of Trade for each lot of cotton anticipated to be submitted for classification. This lot information is transmitted to the Quality Assurance Branch at the time the samples are shipped and is utilized throughout the classification process.

Each shipment of futures samples received by the Quality Assurance Branch is verified for completeness by the Quality Assurance staff. The date received for the shipments are recorded and this date is utilized throughout the classification process to ensure that lots are introduced into the classification process in the order in which they were received. The date received is also utilized to identify lots that are received prior to delivery deadlines.

The Quality Assurance Branch utilizes environmental controls, sample conditioning procedures, calibration procedures and in-house checks for the futures classification process that are consistent to those procedures utilized by the classing offices when providing classing information on new crop samples. However, the classification methodology for futures is more stringent than new crop classification. Samples must be of tenderable qualities (See Table 1) in order to be delivered on futures contracts. The classification of samples of futures cotton is performed without knowledge of any previous classification that may have been assigned to the bales of cotton. Each time a bale is sampled for futures classification it is assigned a new warehouse bale number and placed in a new lot. The Permanent Bale Identification number is not included in the information provided to the Cotton Program

Each sample submitted for futures classification is tested on two separate HVI systems. The individual test results from the two HVI systems are averaged for micronaire, strength, length, length uniformity, HVI percent area, color rd and color +b. The average result for each quality factor is released as the official classification result. The samples are classed by two separate Cotton Program classers to determine the appropriate leaf grade and to identify any type of extraneous matter present. The leaf grade and extraneous matter determinations are assigned based upon the Universal Cotton Standards.

The futures classification data are stored in the Quality Assurance computer system until all samples for a particular lot have completed the classification process. Upon completion, an official classification document is prepared that lists the quality determinations for each bale included in the lot. The classification documents also list those bales that are not tenderable for any quality factor. This information is provided to the certificator, the New York Board of Trade and to the warehouse that submitted the samples in order to generate new warehouse receipts for the bales.

Conclusion

The USDA, AMS, Cotton Program provides classification services to the cotton industry on practically all cotton grown in the United States at the request of producers and for all cotton tendered for delivery on futures contract at the New York Board of Trade. The stringent quality assurance program utilized by the Cotton Program ensures accurate classification results are provided to the cotton industry.

The Cotton Program is proactive and continues to improve quality assurance practices and procedures in order to stay at the forefront of the modern technology and changes that are in use today in cotton classification. The Cotton Program actively investigates new techniques and methods to enhance the accuracy and quality of the services that are provided to the domestic and international cotton industries.

Table 1. Tenderable and Untenderable CottonFor New York Futures Contract Number 2.

Tenderable Cotton

Color Grade	Leaf Grade	Staple	Micronaire	Strength
11	1 – 5	33 and Longer	3.5 – 4.9	22 and Higher **
21	1 – 5	33 and Longer	3.5 – 4.9	22 and Higher **
31	1 – 5	33 and Longer	3.5 – 4.9	22 and Higher **
41	1 – 5	33 and Longer	3.5 – 4.9	22 and Higher **
51	1 – 5	33 and Longer	3.5 – 4.9	22 and Higher **
12	1 - 3	33 and Longer	3.5 – 4.9	22 and Higher **
22	1 - 3	33 and Longer	3.5 – 4.9	22 and Higher **
32	1 - 3	33 and Longer	3.5 – 4.9	22 and Higher **

Untenderable Cotton

All color grades, leaf grades, and staples not included above.
Bales with micronaire readings less than 3.5 or more than 4.9
Bales below 22 GPT strength**
Bales with Level 1 or Level 2 extraneous matter
Bales with mixed quality (code 75), reginned (code 76), repacked (code 77), fire damaged (code 97), or water damaged (code 98)

** Effective with the May 2003 delivery strength reading of 25 GPT or lower is considered untenderable.

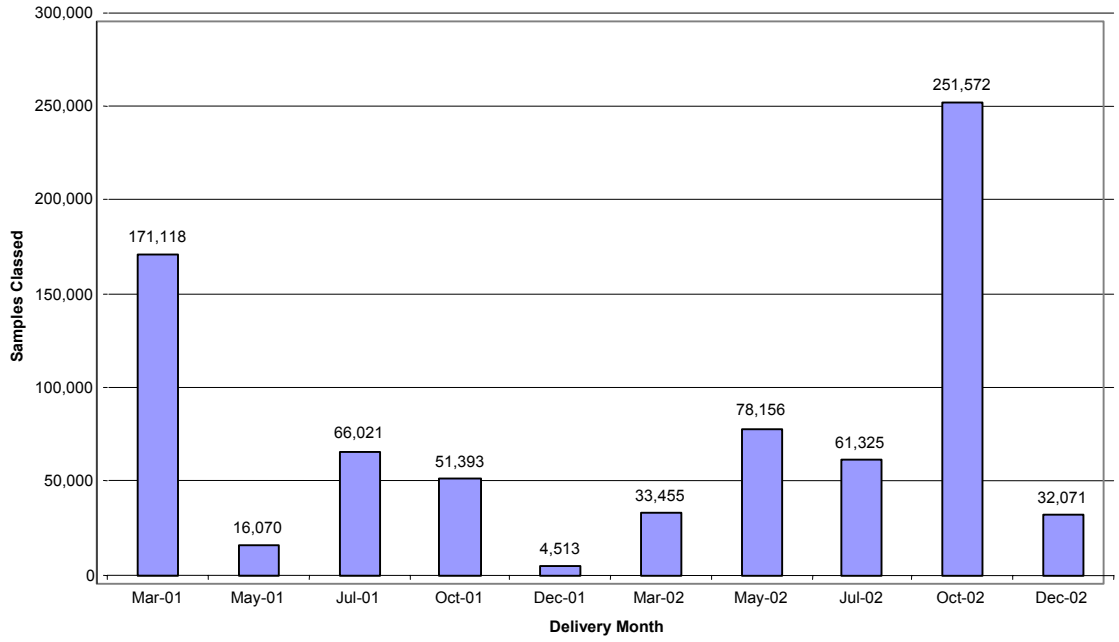

Chart 1. Samples classed by delivery month, 2001-2002.